Registration form

Valves and Controls CEU Training Course $150.00

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Start and Finish Dates: _____ *You will have 90 days from this date in order to complete this course*

List number of hours worked on assignment must match State Requirement. _____

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I have read and understood the disclaimer notice on page 2. Digitally sign XXX

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Phone:
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Operator ID# _____Exp Date_____

Please circle/check which certification you are applying the course CEU's.
Water Treatment _____ Distribution _____ Collection _____

Wastewater Treatment_____ Other _____

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You can obtain a printed version of the course from TLC for an additional $169.95 plus shipping charges.

AFFIDAVIT OF EXAM COMPLETION
I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

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Technical Learning College requires that our students who takes a correspondence or home study program course must pass a proctored course reading, quiz and final examination. The proctor must complete and provide to the school a certification form approved by the commission for each examination administered by the proctor.

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Valves and Controls CEU Course Answer Key

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Did you check with your State agency to ensure this course is accepted for credit?
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You can electronically complete this assignment in Adobe Acrobat DC.

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A felt tipped pen works best.

1. A B C D	19. A B	37. A B C D	55. A B C D
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3. A B C D	21. A B C D	39. A B C D	57. A B
4. A B C D	22. A B C D	40. A B C D	58. A B
5. A B C D	23. A B C D	41. A B C D	59. A B C D
6. A B C D	24. A B C D	42. A B C D	60. A B
7. A B C D	25. A B C D	43. A B C D	61. A B
8. A B	26. A B	44. A B C D	62. A B
9. A B	27. A B	45. A B C D	63. A B C D
10. A B C D	28. A B C D	46. A B C D	64. A B C D
11. A B C D	29. A B C D	47. A B C D	65. A B C D
12. A B C D	30. A B	48. A B C D	66. A B C D
13. A B C D	31. A B	49. A B C D	67. A B C D
14. A B C D	32. A B	50. A B C D	68. A B C D
15. A B C D	33. A B	51. A B C D	69. A B C D
16. A B	34. A B	52. A B C D	70. A B C D
17. A B	35. A B C D	53. A B	71. A B C D
18. A B	36. A B C D	54. A B	72. A B

73. A B	87. A B C D	101. A B C D	115. A B C D
74. A B C D	88. A B C D	102. A B C D	116. A B C D
75. A B C D	89. A B C D	103. A B C D	117. A B C D
76. A B C D	90. A B	104. A B C D	118. A B
77. A B C D	91. A B	105. A B C D	119. A B
78. A B	92. A B C D	106. A B	120. A B C D
79. A B	93. A B C D	107. A B C D	121. A B C D
80. A B C D	94. A B C D	108. A B C D	122. A B C D
81. A B C D	95. A B	109. A B C D	123. A B C D
82. A B C D	96. A B	110. A B C D	124. A B C D
83. A B C D	97. A B C D	111. A B C D	125. A B C D
84. A B	98. A B C D	112. A B C D	
85. A B C D	99. A B C D	113. A B C D	
86. A B C D	100. A B	114. A B C D	

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Signature

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Please e-mail or fax this survey along with your final exam

VALVES AND CONTROLS CEU TRAINING COURSE
CUSTOMER SERVICE RESPONSE CARD

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E-MAIL_____PHONE_____

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When Finished with Your Assignment...

REQUIRED DOCUMENTS
Please scan the **Registration Page, Answer Key, Proctoring report, Survey and Driver's License** and email these documents to info@TLCH2O.com.

IPhone Scanning Instructions
If you are unable to scan, take a photo of these documents with your **iPhone** and send these photos to TLC, info@TLCH2O.com.

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Valves and Controls CEU Course Assignment

The Valves and Controls CEU Assignment is available in Word on the Internet for your convenience, please visit www.ABCTLC.com and download the assignment and e-mail it back to TLC.

You will have 90 days from the start of this course to complete in order to receive your Professional Development Hours (**PDHs**) or Continuing Education Unit (**CEU**). A score of 70 % is necessary to pass this course. If you should need any assistance, please email all concerns and the completed manual to info@tlch2o.com.

We would prefer that you utilize the enclosed answer sheet in the front, but if you are unable to do so, type out your own answer key. Please include your name and address on your manual and make copy for yourself.

Multiple Choice, please select only one answer per question. There are no intentional trick questions. (s) Means plural or singular

Write down any problem questions.

Introduction to Water System Valves

Water Distribution System Design and Valves
System Elements

1. Booster stations are used to _____ from storage tanks for low-pressure mains.
A. Increase water pressure C. Boost flow
B. Equalize D. None of the above

2. Arterial main are interconnected with smaller distribution mains to form a complete gridiron system and are mains for?
A. Increasing water pressure C. Distribution mains of large size
B. Fire protection D. None of the above

3. Storage reservoirs are structures used to store water and _____ the supply or pressure in the distribution system.
A. Equalize C. Provide a reserve pressure
B. Complete gridiron system D. None of the above

4. Valves control the flow of water in the distribution system by isolating areas for repair or by?
A. Increase water pressure C. Regulating system flow or pressure.
B. Complete gridiron system D. None of the above

5. According to the text, Gate valves should be used in the _____for main line isolation.
A. Increase water pressure C. Distribution system
B. Distribution tree D. None of the above

6. Distribution mains function is to carry water from the water source or treatment works to users, these are the pipelines that make up the?
A. Distribution system C. Distribution tree
B. Arterial system D. None of the above

Butterfly Valve
7. Butterfly valves are rotary type of valves usually found on large transmission lines, and may also have an additional valve beside it known as a_____ to prevent water hammer.
A. Regulator C. Bypass
B. Complete gridiron system D. None of the above

Water Distribution Valves
8. The purpose of installing shutoff valves in water mains at various locations within the distribution system is to allow sections of the system to be taken out of service for repairs or maintenance, without significantly curtailing service over large areas.
A. True B. False

9. All buried small- and medium-sized valves should be installed in the sidewalk.
A. True B. False

10. According to the text, at intersections of distribution mains, the number of valves required is normally one less than the number of?
A. Ties C. Throttling purposes
B. Radiating mains D. None of the above

11. For large shutoff valves, it may be necessary to surround the valve operator or entire valve within a vault or manhole to allow?
A. Dependability C. Stops or allows
B. Repair or replacement D. None of the above

Gate Valves
12. In the distribution system, gate valves are used when a straight-line flow of fluid and?
A. Minimum flow restriction C. Dependability
B. Repair or replacement D. None of the above

13. In the distribution system, or on a residential job, gate valves are so-named because the part that either _____ flow through the valve acts somewhat like a gate.
A. Stops or allows C. Minimum and maximum flow
B. Repair or replacement D. None of the above

14. If the valve is wide open, the gate is _____ into the valve bonnet.
A. Fully drawn up C. Fully drawn down
B. Dependable D. None of the above

15. There is little pressure drop or flow restriction through the valve. Gate valves are not suitable for?
A. Copper lines C. Throttling purposes
B. Pressure drops D. None of the above

16. The control of flow is easy because of the valve's design, and the flow of fluid
A. True B. False

Ball Valves
17. Most ball valves require only a 180-degree turn to either completely open or close the valve.
A. True B. False

18. According to the text, some ball valves are operated by planetary gears.
A. True B. False

19. Ball valves should be either fully-on or fully-off, some ball valves also contain a swing check located within the ball to give the valve a check valve feature.
A. True B. False

Valve Exercising
20. Valve exercising should be done once per year (especially main line valves) to detect malfunctioning valves and to prevent valves from becoming inoperable due to freezing or build-up of rust or corrosion.
A. True B. False

21. A valve inspection should include drawing valve location maps to show distances to the _____ from specific reference.
A. Valve(s) C. Stonelines
B. Monuments D. None of the above

22. Service connections are used to _____ or other plumbing systems to the distribution system mains.
A. Be isolated C. Limits the expansion
B. Connect individual buildings D. None of the above

If Excessive Torque is Needed to Work the Valve
23. One cause of a valve failing to open are variations in the temperature and/or pressure of the?
A. Valve sealing surfaces C. Working fluid
B. Closing torque applied D. None of the above

24. Depending on the seat and wedge material, _____ and closing torque applied, thermal binding can occur in high temperature situations.
A. Working fluid C. Length of exposure
B. Closing torque applied D. None of the above

25. Over-pressurization is when a valve can _____ when high pressure enters the cavity and has no way to escape.
A. Lock in the open position C. Positive pressure differential
B. Lock in the closed position D. None of the above

26. A single direction sealing gate valve has a nameplate on the side of the valve that has a relief hole or pressure equalizer.
A. True B. False

27. Corrosion will increase the C-Factor and the carrying capacity in a pipe.
A. True B. False

28. Tuberculation corrosion is caused by chemical changes produced by?
A. Electricity or electrolysis C. Chemical changes
B. Hard water D. None of the above

Knife Gate Valve
29. Install the Knife Gate valve so that the arrows on both sides of the body are in the direction of?
A. Positive pressure differential C. Negative pressure differential
B. Handwheel pointing up D. None of the above

Common Rotary Valves
30. Globe valve, a rotary valve is rare to find in most distribution systems, but can be found at treatment plants.
A. True B. False

31. Most Globes have compact OS & Y type, bolted bonnet, rising stems, with renewable seat rings.
A. True B. False

32. According to the text, Globe valves should usually be installed with the inlet below the bonnet.
A. True B. False

33. For light throttling service, the valve may be installed so that the flow enters over the bottom of the seat and goes up through it.
A. True B. False

34. The globe valve may be installed in other orientations, but any deviation from vertical is a compromise.
A. True B. False

Valve Glossary
35. Which of the following valves are used to deliver water from a high pressure to a low-pressure system?
A. Pressure relief C. Pressure sustaining valve
B. Pressure regulating valve D. None of the above

36. Which of the following valves is the simplest type of surge pressure relief is a pressure relief valve?
A. Pressure relief C. Pressure sustaining valve
B. Check valve D. None of the above

37. Which of the following valves respond to pressure variations at their inlets?
A. Pressure relief C. Pressure sustaining valve
B. Gate valve D. None of the above

38. Distribution system water quality can be adversely affected by improperly constructed or poorly located blowoffs of vacuum?
A. Air relief valves C. Altitude-Control Valve
B. Butterfly valve D. None of the above

39. Which of the following are often used on supply lines to elevated tanks or standpipes.
A. Air relief valves C. Altitude Valve
B. Butterfly valve D. None of the above

40. Which of the following valves close automatically when the tank is full and open when the pressure on the inlet side is less than that on the tank side of the valve.
A. Air relief valves C. Altitude-Control Valve
B. PRVs D. None of the above

41. According to the text, which of the following valves are often used on the discharge side of pumps to prevent backflow?
A. Pressure relief C. Pressure sustaining valve
B. Check valve D. None of the above

42. To prevent water contamination this valve in the distribution system lines must be placed in locations that cannot be flooded.
A. Air relief valves C. Altitude-Control Valve
B. PRVs D. None of the above

43. The common complaint of Milky Water is sometimes solved by the installation of?
A. Air relief valves C. Altitude-Control Valve
B. PRVs D. None of the above

44. Which of the following valves is a linear valve used to isolate sections of the water main, to permit emergency repairs without interruption of water service to customers?
A. Pressure relief C. Pressure sustaining valve
B. Gate valve D. None of the above

45. Which of the following valves control the high water level and prevent overflow?
A. Air relief valves C. Altitude-Control Valve
B. Butterfly valve D. None of the above

46. Which of the following valves is designed to, 1. Prevent overflows from the storage tank or reservoir?
A. Air relief valves C. Altitude-Control Valve
B. Butterfly valve D. None of the above

47. Which of the following valves is to maintain a constant water level as long as water pressure in the distribution system is adequate?
A. Air relief valves C. Altitude-Control Valve
B. Air and Vacuum relief valve D. None of the above

48. Which of the following valves has a movable disc as large as the full-bore opening of the valve?
A Butterfly valve C. PRVs
B. Air and Vacuum relief valve D. None of the above

49. Which of the following valves maintains constant downstream pressure regardless of fluctuating demand?
A. Pressure relief C. Pressure sustaining valve
B. Gate valve D. None of the above

50. Which of the following valves controls water pressure by restricting flows, the pressure downstream of the valve regulates the amount of flow?
A. Pressure relief C. Pressure sustaining valve
B. Pressure regulating valve D. None of the above

51. Which of the following valves are of the globe valve design?
A. Check valve C. Pressure regulating valve
B. Gate valve D. None of the above

52. Which of the following valves control water pressure and operate by restricting flows?
A. Pressure relief C. Pressure sustaining valve
B. Pressure regulating valve D. None of the above

53. Air and Vacuum relief valve: Both of these functions are in one valve.
A. True B. False

System Layouts
Tree System
54. Newer water systems are frequently expanded with planning and developed into a tree-like system.
A. True B. False

55. The Tree system consists of a single main that _____ as it leaves the source and progresses through the area originally served.
A. Limits the expansion C. Connect individual buildings
B. Decreases in size D. None of the above

56. Smaller pipelines _____the main and divide again, much like the trunk and branches of a tree.
A. Branch off C. Limit the expansion
B. Are manifolded to D. None of the above

57. There are several advantages gained by laying out water mains in a loop or grid, with feeder and distributor mains interconnecting at roadway intersections and other regular intervals.
A. True B. False

Friction Loss
58. The damaged section can be isolated and the remainder of the system will still carry pressure, water will not be distributed if a single section fails.
A. True B. False

59. During periods of peak fire flow demand, there will be less impact from _____ in water mains as the velocity within any given section of main.
A. Carrying capacity C. Static pressure
B. Friction loss D. None of the above

Hydraulics
60. Hydraulics is a branch of engineering concerned mainly with moving liquids.
A. True B. False

61. Hydrostatics is based upon the Greek word for water, and originally covered the study of the physical behavior of water at rest and in motion.
A. True B. False

62. Hydraulics may be the physical property that varies over the largest numerical range, competing with electrical resistivity.
A. True B. False

63. Which of the following terms includes the manner in which liquids act in tanks and pipes, deals with their properties, and explores ways to take advantage of these properties?
A. Pressure C. Hydraulics
B. Hydrokinetics D. None of the above

64. Which of the following terms includes the consideration of liquids at rest, involves problems of buoyancy and flotation?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above

65. Hydraulics is applied commonly to the study of the _____, other liquids, and even gases when the effects of compressibility are small.
A. Fluids C. Mechanical properties of water
B. Flow D. None of the above

66. Hydraulics can be divided into two areas, this term and hydrokinetics.
A. Fluids C. Mechanical properties of water
B. Hydrostatics D. None of the above

67. Which of the following terms includes the behavior of all liquids, although it is primarily concerned with the motion of liquids?
A. Fluids C. Hydraulics
B. Flow D. None of the above

68. Which of the following terms includes the study of liquids in motion, is concerned with such matters as friction and turbulence generated in pipes by flowing liquids?
A. Pressure C. Hydraulics
B. Hydrokinetics D. None of the above

69. Which of the following terms is about the pressures exerted by a fluid at rest?
A. Pressure C. Hydraulics
B. Hydrostatics D. None of the above

70. Which of the following is an excellent example of deductive mathematical physics, and in which the predictions agree closely with experiment?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above

71. Which of the following is usually stated that a fluid is a substance that cannot resist a shearing stress, so that pressures are normal to confining surfaces?
A. Hydrostatics C. Flow
B. Hydrokinetics D. None of the above

Atmospheric Pressure
72. The atmosphere is the entire mass of air that surrounds the earth.
A. True B. False

73. If you were to ascend, the atmospheric pressure increases by approximately 1.0 psi for every 2,343 feet.
A. True B. False

74. Which of the following if you could be below, in excavations and depressions, atmospheric pressure increases?
A. Static pressure C. Sea level
B. Gauge pressure D. None of the above

75. Pressures under water differ from those under air only because the weight of the water must be added to the?
A. Pressure(s) of the air C. Seal Level
B. Height D. None of the above

76. Which of the following can be measured by any of several methods, one method is the mercury column barometer?
A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

77. Which of the following is the layer called that extends upward for about 500 miles, the section of primary interest is the portion that rests on the earth's surface and extends upward for about 7 1/2 miles?
A. Column C. Mass
B. Troposphere D. None of the above

78. According the text, if a column of air 1-inch square extending all the way to the "atmosphere", this column of air would weigh approximately 2.31 pounds at sea level.
A. True B. False

79. At sea level and at a temperature of 0° Celsius (C), the height of the mercury column is approximately 30 inches, or 76 centimeters. This represents a pressure of approximately 14.7 psi.
A. True B. False

80. Which of the following at sea level is approximately 14.7 psi?
A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

81. Which of the following could be measured with the aneroid Barometer?
A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

82. The atmospheric pressure does not vary uniformly with?
A. Barometer C. Altitude
B. Weight D. None of the above

83. Atmospheric pressure is defined as the force per unit area exerted against a surface by the _____ of the air above that surface.
A. Barometer C. Altitude
B. Weight D. None of the above

Barometric Loop
84. According to the text, the barometric loop, will provide protection against backsiphonage, is based upon the principle that a water column, at sea level pressure, will not rise above 33.9 feet. In general, barometric loops are locally fabricated, and are 35 feet high.
A. True B. False

85. Which of the following could be measured an absolute scale, pounds per square inch absolute (psia), or gauge scale, (psiag)?
A. Pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

86. Absolute pressure and gauge pressure?
A. Are the same C. Referred to using pressure
B. Are related D. None of the above

87. Which of the following at sea level is 14.7 psia?
A. Static pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

88. Which of the following is the total pressure?
A. Absolute pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

89. Which of the following would be equal to 14.7 psi, which is the atmospheric pressure?
A. Absolute pressure C. Atmospheric pressure
B. Gauge pressure D. None of the above

90. Gauge pressure is simply the pressure read on the gauge. If there is no pressure on the gauge other than atmospheric, the gauge will read zero.
A. True B. False

Pressure
91. A fluid is a substance that cannot exert any permanent forces tangential to a boundary and any force that it exerts on a boundary must be normal to the boundary.
A. True B. False

92. A force is proportional to the_____, and is called a pressure.
A. Pascal's Principle C. Permanent forces tangential
B. Area on which it is exerted D. None of the above

93. In order for the fluid to be in equilibrium, the pressure must be the same in all directions (or the element would move in the direction of least pressure), and if no other forces are?
A. Permanent forces tangential C. Area on which it is exerted
B. Acting on the body of the fluid D. None of the above

94. Which of the following does water and air have; that is, layers of them slide very easily on one another?
A. Low viscosity C. Volume
B. Shearing force D. None of the above

95. Water is incompressible, while air is very compressible.
A. True B. False

Water Pressure
96. The weight of a cubic foot of water is 62.4 pounds per square foot. The base can be subdivided into 144-square inches with each subdivision being subjected to a pressure of 0.433 psig. This is one of our key foundation for backflow prevention.
A. True B. False

97. Water flowing in a pipe is subject to head loss because of?
A. Friction C. Siphon
B. Weight D. None of the above

98. Which of the following are very frequently stated in terms of the height of a fluid?
A. Weight C. Depth
B. Pressure(s) D. None of the above

99. Water with a pressure head of 10 ft can provide the same _____as an equal amount of water raised by 10 ft.
A. Weight C. Energy
B. Pressure(s) D. None of the above

Pressure and Force
100. Water pressure determines the flow of water from the tap.
A. True B. False

101. Which of the following and force are used extensively in the study of fluid power?
A. Pressure C. Shearing force
B. Fluid(s) D. None of the above

102. Which of the following means a total push or pull. It is the push or pull exerted against the total area of a particular surface?
A. Pressure C. Force
B. Fluid(s) D. None of the above

103. Which of the following means the amount of push or pull applied to each unit area of the surface?
A. Pressure C. Force
B. Fluid(s) D. None of the above

104. Which of the following is the force that pushes water through pipes?
A. Pressure C. Shearing force
B. Fluid(s) D. None of the above

105. Which of the following terms maybe exerted in one direction, in several directions, or in all directions?
A. Pressure C. Force
B. Fluid(s) D. None of the above

Computing Force, Pressure, and Area
106. A formula is used in computing force, volume, and area in fluid power systems. In this formula, P refers to pressure, F indicates volume, and A represents area.
A. True B. False

What is backflow? Reverse flow condition
107. Which of the following can result from an increase in downstream pressure, a reduction in the potable water supply pressure, or a combination of both?
A. Backpressure C. Indirect connection
B. Backsiphonage D. None of the above

108. Which of the following terms is there two forms-backpressure and backsiphonage?
A. Backflow C. Cross-connection
B. Indirect connection D. None of the above

109. The basic mechanism for preventing backflow is a mechanical _____, which provides a physical barrier to backflow.
A. Air gap C. Device or method
B. Backflow preventer D. None of the above

110. Backflow is the undesirable reversal of flow of nonpotable water or other substances through a _____and into the piping of a public water system or consumer's potable water system.
A. Backflow C. Cross-connection
B. Indirect connection D. None of the above

111. Which of the following can occur when there is a stoppage of water supply due to nearby firefighting, a break in a water main?
A. Backpressure C. Indirect connection
B. Backsiphonage D. None of the above

112. Which of the following is a form of backflow caused by a downstream pressure that is greater than the upstream or supply pressure in a public water system or consumer's potable water system?
A. Backpressure C. Indirect connection
B. Backsiphonage D. None of the above

113. The principal types of mechanical backflow preventer are the reduced-pressure principle assembly, the _____, and the double check valve assembly.
A. Air gap C. Device or method
B. Vacuum breaker D. None of the above

114. Which of the following is any temporary or permanent connection between a public water system or consumer's potable water system and any source or system containing nonpotable water or other substances?
A. Cross-connection C. Indirect connection
B. Backsiphonage D. None of the above

115. Which of the following is a form of backflow caused by a negative pressure (i.e., a vacuum or partial vacuum) in a public water system or consumer's potable water system?
A. Backpressure C. Indirect connection
B. Backsiphonage D. None of the above

116. Which of the following can occur whenever the amount of water being used exceeds the amount of water being supplied, such as during water line flushing, firefighting, or breaks in water mains?
A. Backpressure C. Reductions
B. Backsiphonage D. None of the above

117. Which of the following is a means or mechanism to prevent backflow?
A. High hazard installations C. Air break
B. Backflow preventer D. None of the above

Types of Backflow Prevention Methods and Assemblies
118. The type of device selected for a particular installation depends on several factors.
A. True B. False

119. According to the text, an air break is a physical separation between the free flowing discharge end of a potable water supply pipeline, and the overflow rim of an open or non-pressure receiving vessel.
A. True B. False

120. When the air flow is restricted, such as the case of an air gap located near a wall, the _____ separation must be increased.
A. Open receiving vessel C. Air gap
B. Air break D. None of the above

121. An air gap is a physical disconnection between the free flowing discharge end of a potable water pipeline and the top of an?
A. Open receiving vessel C. Barrier to backflow
B. Air break D. None of the above

122. Which of the following must be at least two times the diameter of the supply pipe and not less than one inch?
A. Open receiving vessel C. Air gap
B. Air break D. None of the above

123. According to the text, air gap separations must be vertically orientated a distance of at least twice the inside diameter of the supply, but never less than?
A. 1 inch C. 3 inches
B. 2 inches D. None of the above

124. An obstruction around or near an _____ may restrict the flow of air into the outlet pipe and nullify the effectiveness of the air gap to prevent backsiphonage.
A. High hazard installations C. Air gap
B. Air break D. None of the above

125. An air gap is acceptable for _____ and is theoretically the most effective protection.
A. High hazard installations C. Low pollutional hazards
B. High pollutional concerns D. None of the above